NAVSHIPS 361-1465

TECHNICAL MANUAL

PRELIMINARY

PART 2 - CHAPTER 1

NAVY TYPE ACB
1600 FRAME SIZE

AIR CIRCUIT BREAKER (BATTERY)

WESTINGHOUSE TYPE DBN-60S

DIRECT CURRENT BREAKER
3000A - Continuous Current
335 Volts D-C - 2 Pole

Contract NObs-62391

PART OF BUFFALO S.O. 38-S-795

SWITCHGEAR I.B. 35-270-C13

WESTINGHOUSE ELECTRIC CORPORATION
East Pittsburgh Plant, East Pittsburgh, Pa.

BUREAU OF SHIPS - NAVY DEPARTMENT - WASHINGTON, D.C.

INDEX

Air Circuit Breaker
Navy Type ACB (Westinghouse Type DBN-60S)
1600 Frame Size

Description	Page
List of Illustrations	ii
GENERAL DESCRIPTION	1
Identification Data	1
General	1
Construction	1
Operation	1
Mounting	1
Control Voltage	2
Maintenance	2
COMPONENTS AND ATTACHMENTS	3
Arc Chutes	3
Contact Assembly	3
Mechanism	5
Anti-Shock-Close Device	6
Closing Magnet (Solenoid)	7
Closing Coil Relay	8
Anti-Shock-Open Device	10
Series Overcurrent Trip Device	11
Auxiliary Switch	13
Shunt Trip Device	13
Repair Parts	14

LIST OF ILLUSTRATIONS

Illustrations Included After Page 14

Fig. No.	Westinghouse Ref. Dwg.	Title	Page
1	47-A-6552	General Assembly	
2	32-A-6814	Pole Unit	
3	46-A-8538	Mechanism	
4	32-A-6820	Closing Magnet and Anti-Shock-Close Device	
5	400-D-859	Closing Relay	
6	22-B-7154	Anti-Shock-Open Device	
7	445-D-046	Series Overcurrent Trip Device	
8	Curve 388513	Overcurrent Tripping Curve	
9	32-A-6819	Auxiliary Switch	
10	22-B-7588	Shunt Trip Device	
11	32-B-8054	Certification Data	
12	1-JH-481	Master Plan.	

GENERAL DESCRIPTION

IDENTIFICATION DATA

The circuit breakers described in this book are the battery breakers for the SSR572 and SSR573. The identifying "Shop Order" (which appears on the breaker nameplate) and the applicable "Certification Data" is as follows:

	Certification Data Drawing	
Shop Order	Westinghouse	BuShips
32Y4762	32B8054	SS572-S6205-1503468
*32Y9068	33B2595	

*Spare Breaker

GENERAL

The type "DBN-60S" is a modified 1600 frame type ACB air circuit breaker as appears on Master Drawing 1-JH-481, BuShips Drawing S6205-3221579, and as modified by applicable "Certification Data".

CONSTRUCTION (Fig. 1)

The breaker foundation structure consists of a rigid steel chassis to which are bolted the several subassemblies that make up the complete circuit breaker. The subassemblies are the operating mechanism, pole units, arc chutes, closing relay, closing magnet, anti-shock-open device, anti-shock-close device, series-overcurrent trip devices, auxiliary switch, and shunt-trip device. These parts may be removed and replaced as complete assemblies.

OPERATION

The breaker may be operated manually or electrically. It is closed manually by depressing the latch in the operating handle on the front of the case and turning the handle 90 degrees in a clockwise direction. It may be tripped manually by turning the handle 45 degrees in the opposite direction with the latch held down. Electric operation is accomplished throug use of the closing relay, the closing magnet, and the trip device. Turning the control switch on the control board to "CLOSE" operates the closing relay, which closes the circuit of the closing magnet (solenoid) until the control switch is released. The breaker is tripped by turning the same switch to "OPEN". This operation causes the shunt-trip device to trip the breaker. Excessive currents cause the series-overcurrent device to trip the breaker automatically.

MOUNTING

The circuit breaker is mounted in a steel housing '156', which is fitted with a bolted-on cover '155', in which a transparent window is set to enable the operator to see the position indicator. Fig. 1 shows the drilling plan to stud location. There are eight 1/2-inch mountin bolts which go through the back of the housing and into tapped holes in the steel panel '150'. Six additional bolts, which go through the back of the housing on the circuit breaker centerline, hold the circuit breaker in the housing when the eight mounting bolts are removed.

CONTROL VOLTAGE

The closing magnet, the closing relay, and the shunt-trip device, operate on a nominal voltage of 250 volts d-c.

CAUTION - WARNING - THE CIRCUIT BREAKER SHOULD BE IN THE OPEN POSITION AND THE SWITCHBOARD DE-ENERGIZED BEFORE INSTALLING, ADJUSTING, INSPECTING, REPLACING PARTS, OR REMOVING THE CIRCUIT BREAKER. IF THE BUS CANNOT BE DE-ENERGIZED, USE INSULATED HANDLE TOOLS, RUBBER GLOVES, AND A RUBBER FLOOR MAT.

MAINTENANCE

a. Calibration

The overcurrent trip device is calibrated at the factory to trip the circuit breaker at currents greater than the short-time-delay pickup. The calibration point is marked on the scale plate. This calibration may be changed by turning the insulated knob on the overcurrent trip device. Moving the indicator up decreases the pickup current, and moving it down increases the pickup current. Refer to Fig. 8 which shows the time vs. current characteristic of the overcurrent trip device.

b. Inspection

The frequency of inspection for maintenance will depend upon local conditions.

A complete inspection for preventive maintenance should be made at least once a year. It is recommended that a special inspection be given any breaker that has opened a heavy short-circuit current. If excessive heating is observed, look for loose or corroded contacts or connections. When inspecting the circuit breaker, examine the contact surfaces. Rough or high spots should be removed with a clean file or sandpaper. DO NOT USE EMERY CLOTH.

c. Lubrication

Bearing points in the mechanism may be oiled sparingly. Use a good grade of light machin oil and wipe off excess oil.

d. Disassembly (Fig. 1)

In order to make any inspections, repairs, or replacement of parts it will be necessary to remove the housing cover. To do this, proceed as follows:

1. Open the breaker.
2. Remove handle '166' by removing the set screw.
3. Remove the housing cover by removing the sixteen bolts on the front of the cover. Certain repairs and replacements can now be made without further disassembly. To inspect contacts, remove arc chutes '135'. To work on parts of the breaker still inaccessible, it will be necessary to remove the breaker from the housing.
4. Remove bus connections from breaker studs, control wiring from terminal block '169', and cable from remote manual trip '167'.
5. Remove housing and breaker by removing eight mounting bolts.
6. Remove breaker from housing by removing six bolts holding breaker in housing.
7. The breaker is now exposed for repair or removal of various subassemblies.

e. Assembly

The breaker is reassembled in the reverse order.

COMPONENTS AND ATTACHMENTS

a. ARC CHUTES (Fig. 2)

1. Function

The arc chute (135) Fig. 2 mounted above and surrounding the contact assembly of each pole, has the function of stretching and cooling the arc drawn by the separating contacts so that it may be quickly extinguished and the circuit opened in the least possible time. The arc chutes are an extremely important part of the circuit breaker and the breaker should never be energized without their being mounted in place.

2. Description

Each arc chute consists of a number of metal and asbestos plates supported in a laminated case and held in place by a clamping plate (136) and insulating tube spacers (146) and two screws (147) through the insulating spacers to the molded base (100). When the arc is drawn by the separating contacts, it moves up into the chute by magnetic and thermal action where it is quickly de-ionized and extinguished thus opening the circuit.

b. CONTACT ASSEMBLY (Fig. 2)

1. General

Although this breaker has four pole, the two left poles and the two right poles are each connected in parallel so that there are really only two independent poles. All four poles carry current, however only the inner poles interrupt the current. Thus arcing contacts and arc chutes are supplied only on center two poles.

2. Function

The contact assembly closes and opens the electric circuit through the circuit breaker. See Fig. 2. The upper stud (120), the stationary contact (121), the series overcurrent trip device (400) and the lower stud (105) are stationary and are mounted rigidly on the molded base (100). The moving contact assembly is hinged on the molded base by pin (127) and is moved in and out by molded insulating link (116) which is pivoted on cross bar (168) Fig. 1.

The moving contact assembly is closed and held in the closed position against the force of the accelerating springs (131) by the insulating link (116). When the force exerted by the insulating link is released by tripping the breaker, the accelerating spring quickly moves the moving contact assembly to the open position. When the breaker interrupts high short circuit currents, magnetic forces play a large part in the rapid opening of the contacts

When the main contacts open the moving contact assembly moves away, drawing the arc between the arcing contacts. This arrangement minimizes arc damage to main current carrying contacts. When the circuit breaker is closed the arcing contact surfaces touch first and then the main contacts touch and the closing operation is completed.

3. Description

The stationary contact assembly consists of the main contact extruded integral with the upper stud (120) and the arcing contact (123). Contact surfaces of (121) and (123) are special arc-resisting silver alloy inserts.

The moving contact assembly consists of a contact arm (175) which is pivoted to the pole unit by pin (127) and which carries main moving contact (109) and moving arcing contact (118). Auxiliary contact (176) serves as a bridge between main moving contact and connector to the upper terminal of the series of the overcurrent tripping device.

The moving contact assembly is attached to the mechanism cross bar (168) Fig. 1 by molded insulating link (116) which is screwed on metal link (111) and locked by nut (114). When the breaker is tripped all force is removed from the cross bar and accelerating springs (131) quickly snap the moving contact assembly from the closed to the open position.

4. Adjustments

The correct contact pressure on the breaker is obtained when gap "G" Fig. 1 measures between .030 and .070 inch when the breaker is closed.

To decrease or increase the gap, loosen locknut (114) Fig. 2. If gap is too large, rotate link (116) counterclockwise one-half turn and remeasure the gap. If gap is too small, rotate the link clockwise until the correct measurement is obtained when the breaker is closed.

This adjustment should seldom have to be made.

5. Replacements (Fig. 2)

To replace stationary arcing contact (123) or spring (184):

(a) Remove arc chute (135) by removing screws (147).

(b) Remove the two bolts holding the contact assembly and replace either it or the spring as required.

To replace moving arc contact (118):

(a) Remove arc chute (135) by removing screws (147).

(b) Removal of bolts (112) frees the contact for replacement.

To replace main contact springs (182):

(a) Remove arc chute as before.

(b) Springs are held by locking clips in contact arm (175). These clips release the springs when rotated with a screwdriver or with the fingers.

To replace accelerating springs (131):

(a) Remove arc chute as before.

(b) Springs may be worked out of their sockets with a screwdriver.

To replace bridge springs (183):

(a) Remove arc chute as before.

(b) Springs may be worked out with a screwdriver and replaced. If difficulty is experienced loosen moving contact arm hinge by loosening bolts in vicinity of lower stud holding overcurrent trip and contact arm hinge.

c. MECHANISM
(Fig. 3)

1. Function

The operating mechanism opens and closes the circuit breaker contacts by moving the cros bar (168) Fig. 1 to which the moving contact assemblies are attached by insulating links. Th breaker is closed manually by turning the operating handle quickly and smoothly as far as it will go (90^{o}) in a clockwise direction. The breaker may be tripped manually by turning the handle 45^{o} in a counterclockwise direction. Handle latch (233) must be held in while closing or tripping. The breaker is tripped automatically by one of the automatic devices described later which rotate trip lever (220) about pin (224).

The mechanism is "trip free", that is, it is not possible to close the breaker if one of the automatic tripping devices moves the trip bar up during the closing stroke or if the trip bar (157) Fig. 1 is held in the raised position.

2. Description

The operating mechanism consists of a group of toggle links, and a latch attached to the operating mechanism frame on fixed pins (214), (226), (241), (216), (224), and (245). The cross bar (168) is held by the closing lever (207). Rotating the operating handle clockwise moves the mechanism linkage from the open position shown in Fig. 3 to the closed position shown. This is accomplished when the roller (236) located off-center on the end of the operating handle shaft (232) forces the first toggle link (203) upward pushing second toggle link (204), third toggle link (206) and closing lever (207) ahead of it. The motion of the toggle linkages is directed by link (205) which is pivoted at its lower end on pin (217) in latch (208). Latch (208) in turn is restrained from moving by roller latch (210) which is pivoted on pin (214) and engages trigger (221), on trip lever (220). The linkage is held in the closed position by pawl (209) which latches under pin (227). The handle shaft and lever are returned to the normal position after closing by gravity.

The mechanism is opened by rotating trip lever (220) counterclockwise. This is accomplished either by rotating handle counterclockwise, in which case roller (236) on the end of handle shaft lever strikes the extreme left end of trip lever (220) to move it downward; or by causing tripping attachments to strike trip finger screw (243) or trip bar (157) Fig. 1. In either case the counterclockwise rotation of the trip lever (220) moves trigger (221) out of engagement with the lower end of the roller latch (210) which in turn permits the roller latch to rotate counterclockwise out of engagement with latch (208). Latch (208) is then free to rotate in response to the pull of the latch link (205) so that the mechanism assumes the trip free position shown in Fig. 3 in which the contacts are open but part of the mechanism levers are in the closed position. In this position pawl (209) is disengaged from pin (227) by a lug on link (204) which pushes it up permitting the linkage to collapse to the open position shown in Figure 3.

Gravity returns operating handle to the normal vertical position after manual tripping.

3. Anti-Bounce Latch

The anti-bounce latch (234) prevents the breaker from bouncing closed when interrupting short circuit current. As breaker opens pin (238) strikes latch (234) pivoted on pin (237), rotating the latch until its hook is in position to hold pin (238) from bouncing to the closed position.

4. Position Indicator

Position indicator (230) is formed from sheet metal and is pivoted on pin (241). It is visible from the front of the circuit breaker through a window in the housing and mechanism frame. See Fig. 1. With the circuit breaker in the open position shown in Fig. 3, the amber face of the indicator shows through the window. The word "OPEN" is stamped on this amber face. When the breaker closes, pin (218) of the closing lever (207) pulls indicator link (228) to the right, thus rotating the other face of the indicator up into a position visible through the window. This face is painted blue and is stamped with the word "CLOSED".

5. Replacements

To replace roller latch spring (223):

(a) Disconnect auxiliary switch links.

(b) Rotate handle (166) clockwise until pin (227) is visible through the right side of mechanism frame. Using a small rod as a pusher, shove this pin part way through the hole until the operating rod of the closing magnet drops off. Return pin (227) to its proper location and allow the linkages to fall open. This frees the mechanism from the closing magnet.

(c) Remove crossbar (168) Fig. 1. Remove the four bolts which hold mechanism to the shelf (152) Fig. 1. This frees mechanism from shelf but frees also the closing magnet. This should be either replaced or blocked in place during repairs to the mechanism.

(d) Removal of pin (224) allows trip lever (220) to be removed and spring (223) may then be replaced.

To replace handle stop spring (248):

(a) Remove handle (166) and handle latch (233) and replace spring (248).

To replace pawl spring (225):

(a) This spring may be replaced without further ado after removing mechanism cover (239)

d. ANTI-SHOCK-CLOSE DEVICE
(Fig. 4)

1. Function

This device serves to prevent the circuit breaker contacts from closing from shock when open. This is accomplished by an arrangement whereby a mechanical escapement device or "ticker" is operated by the closing of the breaker. Shock blows tending to close the breaker

are of such short duration that the mechanical escapement device does not have time to operate and the device effectively locks the open circuit breaker in the open position under shock condition.

2. Description

The anti-shock-close device consists of a ticker case (360) Fig. 4 which contains the ticker assembly, bolted to the closing magnet. Arm (348) is bolted to the moving core of the closing magnet and when the moving core moves up, cam (361) is caused to rotate in a clockwise direction around pin (370) against the torsion of return spring (369). As the cam rotates in this manner, oscillator wheel (362) is caused to rotate clockwise around pin (372) by pin (368) mounted in cam (361). The rotation of wheel (362) is regulated by mechanical oscillator (364) which is pivoted on pin (365). This oscillator oscillates due to the engagement of its teeth with the teeth of oscillator wheel (362). When the circuit breaker is tripped, rod (343) drops unimpeded and return spring (369) returns cam and consequently oscillator wheel to the "breaker open" position shown in the figure.

Shock blows tending to close the circuit breaker would have to act in such a way as to raise rod (343). These blows are of such short duration that the cam is restrained long enough by the oscillator wheel and oscillator to prevent closure of the circuit breaker.

3. Replacements

To replace reset spring (369):

(a) Remove device from closing magnet yoke (340) by removing bolts.

(b) Removing snap rings (367), (371), and (373) will allow corresponding pin to be removed. The various parts are then free to be removed and the spring may be replaced.

(c) After reassembly, be sure that the cam operates freely and that it returns freely to its starting position when pushed over.

e. CLOSING MAGNET (SOLENOID)
(Fig. 4)

1. Function

The closing magnet is the device used to close the circuit breaker electrically and is mounted directly below the mechanism and under the shelf of the circuit breaker. It is secured to the shelf with the same four bolts that hold the mechanism in place.

Together with a control switch, a source of power, and the closing relay, the closing magnet enables an operator to close the circuit breaker from a remote point.

2. Description

The closing magnet consists of an iron frame or yoke (340) which is securely bolted to the circuit breaker shelf by the four bolts (349), a plunger or moving core (342), an operating rod (343), a stationary core (341) and a coil (347).

The operating rod (343) connects the moving core (342) to pin (227) Fig. 3 of the mechanism. It will be observed that an upward movement of this pin will cause the mechanism to close and latch the circuit breaker.

When coil (347) of the closing magnet is energized by contact of relay the moving core (342) moves upward in response to the magnetic attraction between stationary and moving cores across air gap. About one-tenth of a second is required for the closing magnet to close and latch the circuit breaker. When the moving core moves into the "breaker closed" or "closed gap" position, arm (359) trips the relay mechanically, and its contacts open, thus de-energizing the closing magnet. Arm (348) in moving up lifts trip rod (357) which rotates trip arm (356) against the force of spring (355). This rotation of trip arm (356) engages trip screw (327) of closing relay Fig. 5 and trips the relay. The closing coil is momentarily rated and serious damage will result if potential is allowed to remain on its terminals through improper adjustment of trip screw (327) of closing relay Fig. 5 so that relay does not trip and interrupt closing coil circuit. When the moving core and operating arm have pushed the mechanism linkages to the closed and latched position, pin (227) Fig. 3 holds the moving core in the "closed gap position".

When the mechanism is tripped, pin (227) Fig. 3 falls allowing operating arm and moving core to fall with it.

3. Replacements

To replace the closing coil (347):

(a) Remove arm (348) by removing bolts (351).

(b) Remove plate (346) by removing four bolts (350).

(c) Remove coil leads and replace.

To replace spring (355):

(a) This spring may be replaced by removing snap ring from pin (358) and sliding trip arm (356) off.

(b) Relay Fig. 5 must be removed from shelf first.

f. CLOSING RELAY
(Fig. 5)

1. Function

The closing relay is mounted on the underside of the breaker shelf to the left of the closing magnet. The relay has the function of closing and opening the closing coil circuit in electrical operation. Together with the shunt trip, the closing relay enables the operato to have remote control of the circuit breaker electrically by means of a control switch, from the control board.

2. Description

(a) The relay base '300', is molded from insulating material. The contact assemblies, coil assembly, and other parts are attached to this base. The frame '305', serves as part of the magnetic circuit of the coil '338', and also serves to hold the coil in place. This frame or yoke is fastened to the molded base by three screws '318'. The coil '338', is wound on a molded spool '339', and is held in place by a guide tube '337', which extends from the top of the molded base through the bottom of the frame '305', and through the center of the spool.

At its upper end, the guide tube '337', holds the stationary core '306' firmly in place again the frame. The moving core '333', is free to slide up and down in the guide tube '337'.

(b) When moving up, in response to the magnetic pull between the stationary and moving cores when the coil is energized, it pulls the latch '336', fastened to a pin '335', up with it. When the coil '338', is energized, a spring '334', bearing against the latch '336', holds thi latch in such a position that it is hooked under a latch pin '316'. This causes the moving contact arm assembly '301', to rotate counterclockwise around the contact arm pin '329', ther by compressing a spring '312'. The moving contacts '303', are thus pulled against the stationary contacts '304', completing the circuit. The moving core is shown in the upper "contacts closed" position.

(c) As soon as the contacts close, current starts flowing through the closing coil of the circuit breaker. The moving core '342', Fig. 4, of the closing magnet moves up, closing the circuit breaker. The trip bracket '359', moves up with the moving core of the closing magnet and engages a trip rod '357'. The trip rod rotates the relay trip arm '356', around a pin '358', against the force exerted by the spring '355'. The relay kicker in rotating, engages the relay trip finger '327' to lift it and trip the relay as described below. The trip finge '327', is fastened to a release bracket '308', and rotates it counterclockwise around a pin '317', against the torque exerted by the torsion spring '313'. When the release bracket '308 is rotated in this manner, it strikes the bottom of a latch '336', rotating it counterclockwise around a pin '335', against the force of the spring '334'. This rotation of the latch '336', causes it to become disengaged from the latch pin '316'. Consequently the spring '312 extends, causing the moving contact assembly '301', to rotate clockwise, snap the moving contacts '303', away from the stationary contacts '304', and interrupt the circuits.

(d) With the circuit breaker in the closed position the relay trip arm '356', Fig. 4, of the closing magnet holds the trip finger '327' of the relay in the trip position. Therefore, eve though the relay coil may be inadvertently energized when the circuit breaker is latched, the relay contacts will not close, and current will not flow through the circuit breaker closing coil. The moving contacts, '303' are resiliently mounted by means of springs '314', around studs set into the moving contact arm '301', and are secured by elastic stop nuts '315'. Thi causes a slight rolling and wiping action on the spherically-shaped contact surfaces as they meet, which helps to insure a positive electrical connection.

(e) An arc chamber '310', molded from arc-resisting material, surrounds the contacts. It is held in place by means of the two iron plates of the blowout magnet assembly '302', which in turn is fastened to the molded base '300', by means of a screw '323'. The blowout magnet coi is connected in series with the contacts, so that flux is flowing through the magnetic circui and the air gap of the blowout magnet assembly, at the time the contacts part and draw an arc. The magnetic circuit is so arranged that its air gap is across the arc chamber and the arc. The arc is forced by magnetic action down into the arc chamber, where it is extinguished due to the stretching and cooling process.

The right-hand blowout coil lead may be connected to terminal as shown or the adjacent terminal. See specific wiring diagram.

DANGER

Before working on the relay, make sure that the circuit breaker is open and that the upper and lower studs are dead. Be sure that the control circuits are dead. Remember that control wiring may be "hot" even though the main circuit breaker studs are dead.

3. Replacements

(a) Before replacing parts of the relay, it is best to disconnect the wiring and remove the relay from the circuit breaker as follows: Remove screw '322' and lift off the molded cover '309', of the relay thus exposing the four numbered terminals. Remove and tag the wires from the four terminals by loosening the four screws '320'. Remove the front cover of the auxiliary switch and disconnect the relay coil lead. Remove the two screws through the circuit breaker shelf which hold the relay to the shelf. The relay can now be removed.

(b) To replace the relay coil: Remove the three screws holding the coil frame '305' to the molded base '300', and remove from base. Pull out the guide tube '337', allowing the stationary core '306', to drop out. Replace coil.

(c) To replace the latch spring '334': Remove the three screws holding the coil frame '305', to the base '300'. Pull out the guide tube '377', and stationary core '306'. Lift out the moving core assembly '333'. Rotate the latch '336', clockwise as far as it will go. A spring '334', will drop out. Be sure it is replaced.

(d) To replace the trip spring '313': Remove the snap ring from one end of the release bracket pin '317', and push the pin out. Replace the pin and a new spring.

(e) To replace the moving contact arm spring '312': Remove the snap ring from one end of the contact arm pin '329', and push pin out. Remove the moving contact arm assembly '301', and replace the spring '312'.

(f) To replace the moving contact '303', or contact spring '314': Remove the elastic stop nut '315', and replace the spring (if necessary). If a moving contact is to be replaced, disconnect its lead from under the applicable terminal screw '319'. Remove and replace it.

(g) To replace the blowout magnet assembly: Disconnect leads of the blowout coil. Remove the screw '323', and replace the blowout magnet assembly.

(h) To replace the stationary contact assembly: Remove the blowout magnet assembly as outlined above. Remove the applicable screw '321', and replace the contact.

g. ANTI-SHOCK-OPEN DEVICE
(Fig. 6)

1. Function

This device prevents tripping of the circuit breaker due to rotation of the trip lever caused by shock but allows normal rotation of the trip lever by tripping devices.

2. Description

The bracket (250) Fig. 6 is mounted on the supporting frame shelf to the immediate right of the operating mechanism frame (200) Fig. 1 and is held to the shelf by two screws (256). Plate (252) is pivoted on pin (253) as is lever (268). Lever and plate are connected by set screw (269) in such a way that if the trip bar (157) Fig. 1 rises, lever (268) rotates counter clockwise around pin (253) and plate (252) is caused to rotate in the same direction. Conversely, if plate (252) is restrained from rotating, trip bar is held down by lever (268). Under shock conditions, plate (252) is restrained from moving in the following manner:

Studs (255) and (258) are suspended on pin (251) and plate (252) is fitted with a slot in its end arranged so that the plate will slide down and allow the circuit breaker to trip under normal tripping impulses. Under shock conditions, however, the two outboard studs are caused to rotate around pin (251) due to the off-center weights (257), thus jamming the plate (252) from sliding down. The middle stud is actuated by a separately pivoted weight (267) which rotates about pin (264). Spring (263) serves to hold weight in position shown during normal operation.

3. Adjustment

With the breaker closed any motion of trip bar (157) should cause plate (252) to move down. Pushing trip bar down about 1/16 inch should cause 3/64 inch or less upward motion of slotted end of plate (252). Adjustment should be made with breaker open by turning screw (269 Tighten locknut (270) after final adjustment.

4. Replacements

To replace reset spring (262):

(a) Remove cover screws (271) and cover.

(b) Remove device from shelf by removing screws (256).

(c) Removal of pin (253) will allow spring (262) to be replaced.

To replace weight spring (263):

(a) Repeat (a) and (b) above.

(b) Removal of pin (264) will free weight (267) and allow weight spring (262) to be replaced.

h. SERIES OVERCURRENT TRIP DEVICE
(Fig. 7)

1. Function

This device provides for selective protection of the various portions of the electrical system under two distinct conditions of current: First, for low overcurrent values, it will trip the breaker after a short time delay; and second for higher values of overcurrent it will trip the circuit breaker instantaneously. See Figure 8 for overcurrent tripping characteristi

2. Description

The device is actuated by the magnetic forces produced by current flowing in the pole units. The current paths for each set of parallel poles pass through the overcurrent trip magnetic circuit in such a way that their magnetic forces aid one another.

The short time delay pickup calibration is set at the factory at the ampere setting marked on the nameplate. The operating time consists of three different time settings: minimum, intermediate, and maximum time. If an overcurrent occurs of greater magnitude than the short time delay pickup setting, the circuit breaker will trip subject to a short time delay as determined by a gear escapement mechanism.

At currents above the instantaneous setting, the circuit breaker trips without any intentional time delay. The pickup setting is made at the factory and is not readily adjustable in the field.

If during the short time delay period the current drops to 100% of rated overcurrent trip coil current, the series overcurrent trip device will reset and the breaker will not trip provided the overcurrent has not persisted beyond the time indicated by the lower edge of the band curve for the particular breaker involved.

3. Short Time Delay

The tube (440) consists of an upper non-magnetic tube and an armature (455) of magnetic material.

With an overcurrent in excess of pickup, the magnetic force between lower core (455) and yoke ring (468) will cause the tube to rise and trip the breaker restrained only by the mechanical escapement device.

The pin (472) in lower core is attached to a mechanical escapement device enclosed in housing (458). This device consists of a lever (459) pivoted on a fixed pin (463) and connected through instantaneous spring (420) to gear segment (460) which operates pinion (474) and oscillator wheel (461) which is on the same sheet. Oscillator wheel (461) is impeded from free rotation by oscillator (462).

4. Instantaneous Trip

With fault currents of sufficient magnitude to extend instantaneous spring (420), the operation is identical with the above except that the upward motion of the tube is not restraine by oscillator (462) due to the extension of instantaneous spring (420).

5. Replacements

To replace calibration springs (410):

(a) Remove bolts (451) and (478) from back of panel and remove trip device.

(b) Remove insulation cover (484) by removing screws (475) and (495). Calibration sprin (410) are now accessible for replacement.

To replace instantaneous spring (420):

(a) Repeat (a) and (b) above.

(b) Remove housing (458) from yoke (457) by removing four screws (473).

(c) Spring (420) may be replaced by loosening adjusting screw (469). Arm (456) must be pin-pricked near the screw after replacement for locking purposes.

NOTE: Any field replacements on the overcurrent trip device should be regarded as temporary pending recalibration.

i. AUXILIARY SWITCH
(Fig. 9)

1. Function

The auxiliary switch is used to close or open auxiliary or control circuits. The closed or open positions of its sets of contacts are coordinated with the closed or open position of the main circuit breaker contacts.

2. Description

The four pole type RC auxiliary switch is mounted on the top of the supporting frame shelf to the left of the operating mechanism. It is operated by shaft (555) and arm (557) which connects to the closing lever of the operating mechanism.

The contacts are designed to carry 15 amperes continuously or 250 amperes for three seconds.

The auxiliary switch is a shaft-operated, four pole, rotary type having "a" and "b" contacts. An "a" contact is one that is open when the circuit breaker is open, and a "b" contact is one that is closed when the circuit breaker is open. See switchboard wiring diagram for auxiliary switch contact arrangement.

A square shaft (555) extends through the rotor molds (560) which in turn isolate and support the rotor contacts (562). The rotor assembly is clamped together into a solid unit by screw (564). The rotor contacts are set 90° apart for 90° rotation of shaft (555).

Contact fingers (553) have one end hooked into stem (551) with spring (554) maintaining pressure between the finger contact and stem. The center of the contact finger bears against a stop surface in casing (550) to position the outer end of the contact finger.

3. Replacement of Auxiliary Switch

(a) Remove and tag the terminal connections.

(b) Disconnect arm (557) from breaker lever, remove the two mounting bolts and remove switch

(c) Remove link from closing lever (207) Fig. 3 and add to new switch.

j. SHUNT TRIP DEVICE
(Fig. 10)

1. Function

The shunt trip device serves as a means of tripping the circuit breaker from some remote point by the closing of a control switch or relay contacts at that remote point.

2. Description

The shunt trip device is mounted on the left side of the supporting frame shelf. See Fig. 1. It consists of a frame, coil and moving core mounted horizontally. Energizing trip coil (513) causes a magnetic attraction between stationary core (503) and moving core (504) which causes moving core (504) to move to the left rotating trip lever (501) about pin (502).

Lever (501) raises trip bar (157) Fig. 1 to trip the circuit breaker. The opening of the cir cuit breaker de-energizes the shunt trip coil through an "a" contact of the auxiliary switch. Spring (508) returns moving core (504) to its normal position. Non-magnetic washer (510) pre vents residual magnetism from holding the cores together when the coil is de-energized.

3. Replacements

To replace coil (513):

(a) Disconnect the shunt trip leads from the auxiliary switch.

(b) Take out the two bolts (515) and remove the shunt trip assembly from the supporting frame.

(c) Remove pin (502) and screws (509) holding plate (505) in place and drop out the mov ing core (504), stationary core (503) and sleeve (507). The coil is then free to b replaced.

To replace spring (508):

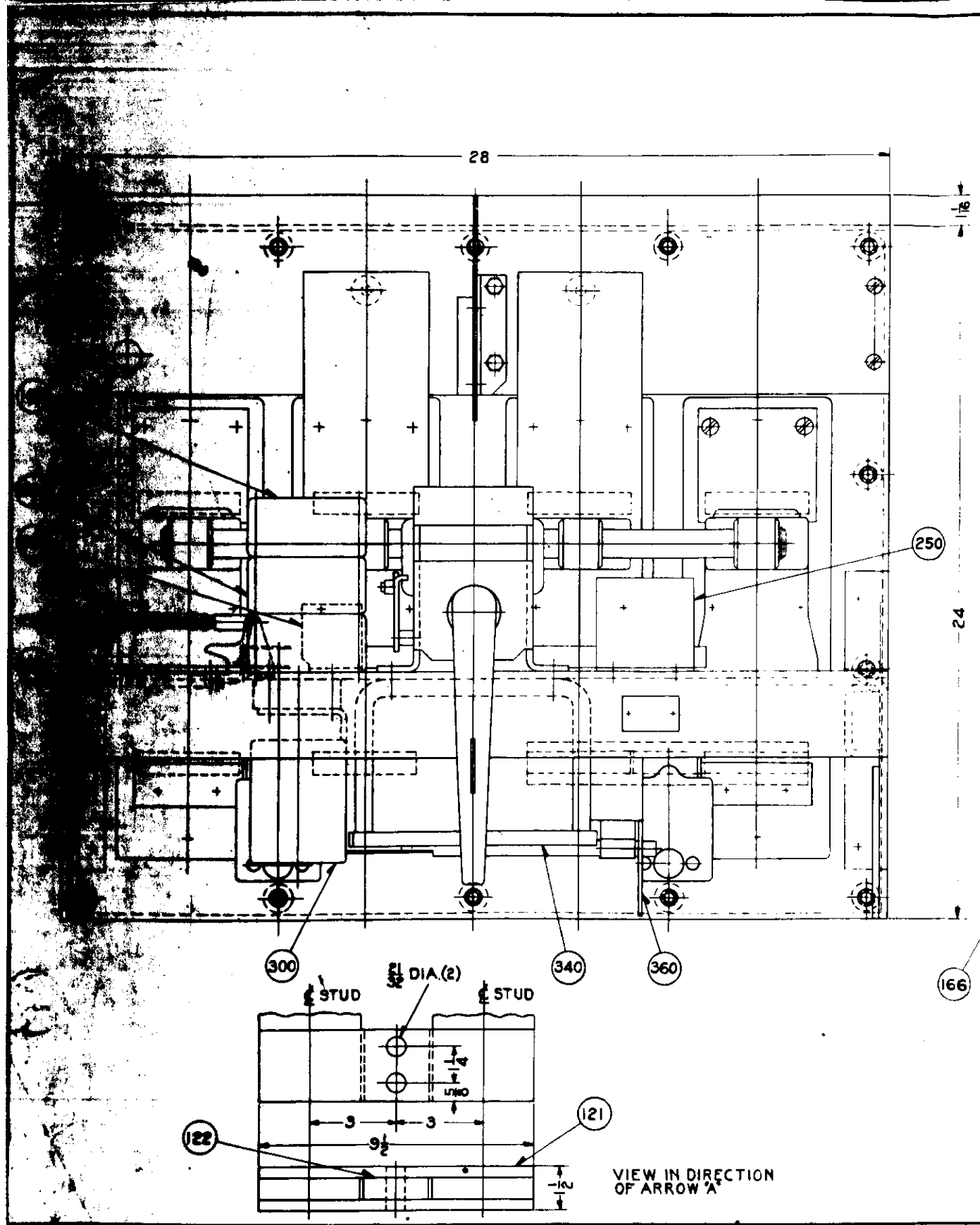
(a) Repeat operations (a) and (b) above.

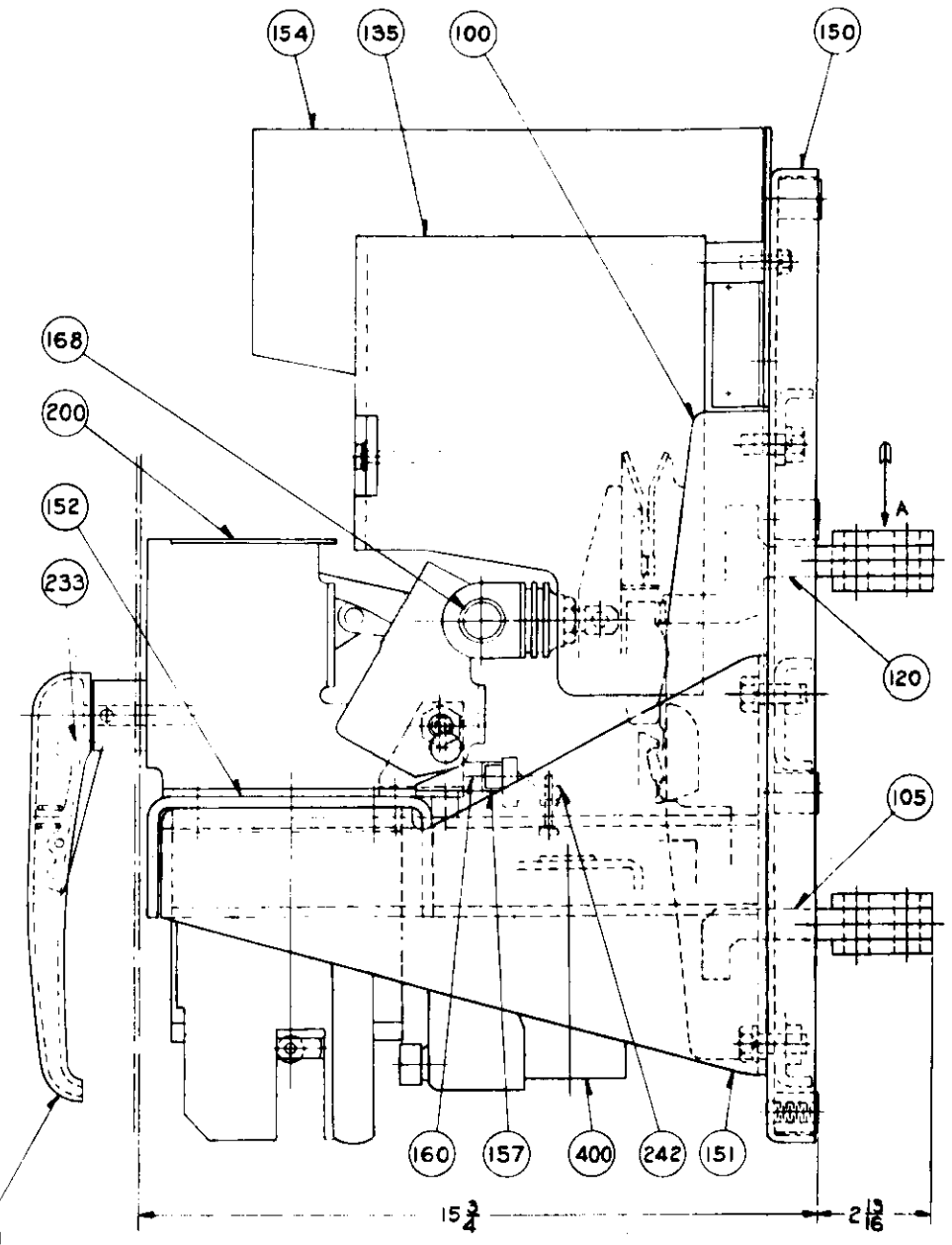
(b) Remove pin (502) and replace spring (508).

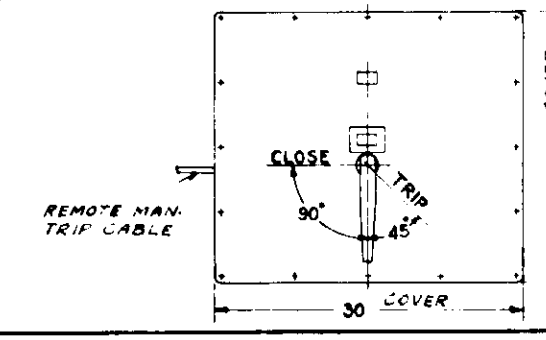
k. REPAIR PARTS

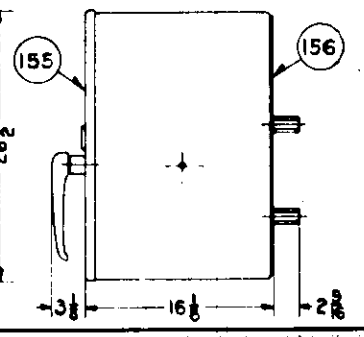
Potential coils, springs, arcing contacts, and auxiliary switches are supplied as repair parts. For style number identification refer to Certification Data Sheets listed on Page 1.

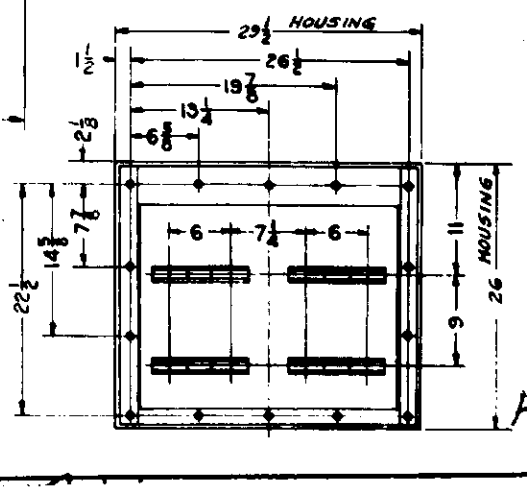
TOP





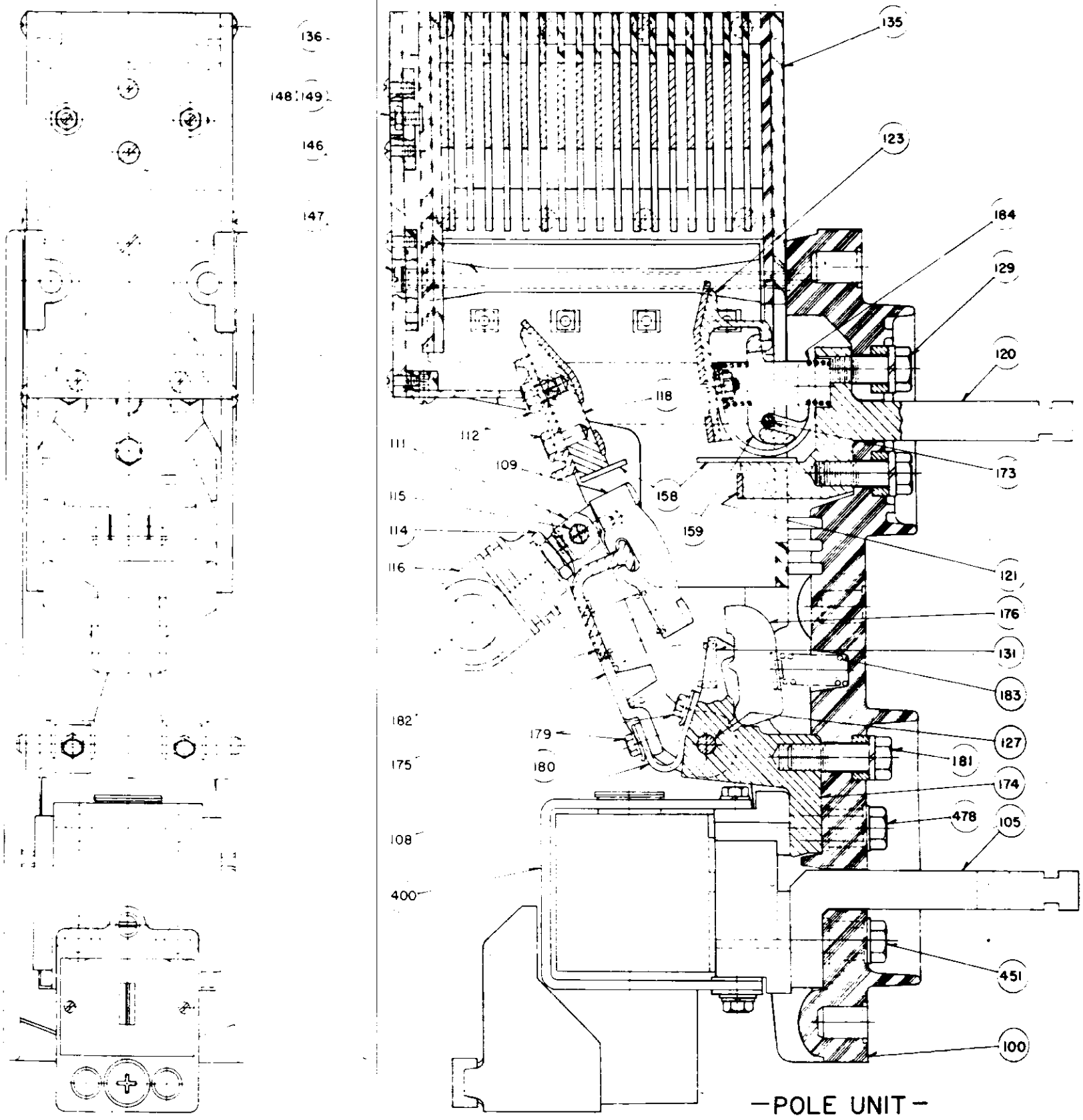






100	MOLDED BASE
105	LOWER STUD
120	UPPER STUD
121	CONNECTER
122	SPACER
135	ARC CHUTE
150	STEEL PANEL
151	SUPPORTING FRAME
152	SHELF
154	BARRIER
155	HOUSING COVER
156	HOUSING
157	TRIP BAR
160	ELASTIC STOP NUT
166	OPERATING HANDLE
167	REMOTE MANUAL TRIP
168	CROSS BAR
169	TERMINAL BLOCK
200	MECHANISM
233	HANDLE LATCH
242	TRIP FINGER
250	ANTI-SHOCK OPEN DEVICE
300	CLOSING COIL CONTACTOR
340	CLOSING MAGNET
360	ANTI-SHOCK CLOSING DEVICE
400	OVERCURRENT TRIP
500	SHUNT TRIP DEVICE
550	SWITCH, AUXILIARY

Fig. 1

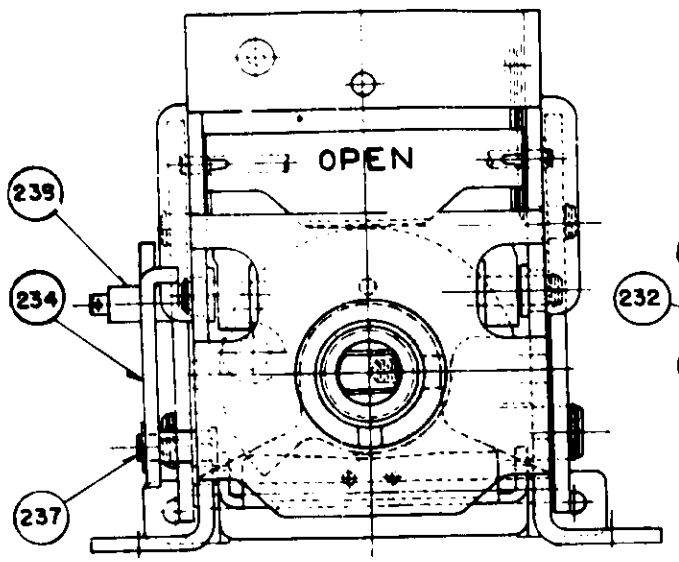


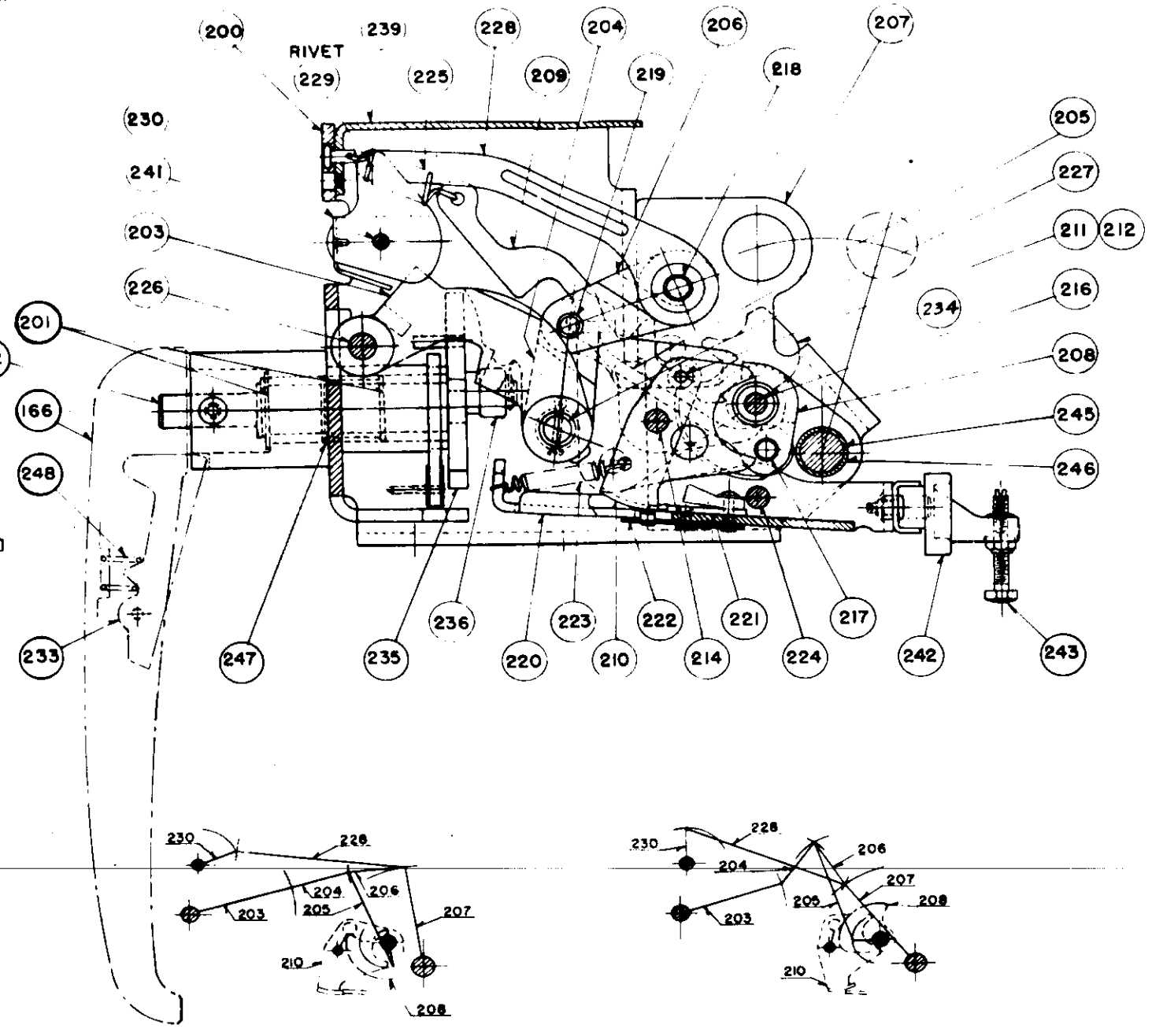
100	MOLDED BASE	
105	LOWER STUD	
108	SHUNT	
109	CONTACT, MOVING MAIN	
111	LINK	
112	5/16-18 X 1/2 HEX. STL. BOLT	
114	5/16-18 BRS. LOCKNUT	
115	PIN	
116	MOLDED LINK	
* 118	CONTACT, MOVING ARCING	
120	UPPER STUD ASSEMBLY	
121	CONTACT, STATIONARY	
* 123	CONTACT, STATIONARY ARCING	
127	PIN	
129	1/2-13 X 1 1/2 HEX. STL. BOLT	
135	ARC CHUTE	
136	CLAMPING PLATE	
146	TUBE SPACER	
147	5/16-18 X 8 1/4 PAN HD. STL. SCREW	

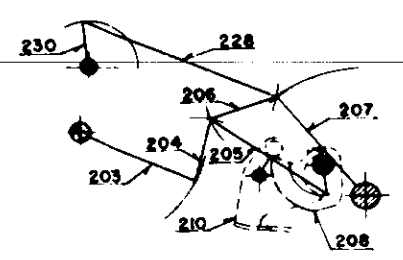
148	1/4-20 HEADLESS SET SCREW	
149	1/4-20 GALV STL LOCKNUT	
158	CONTACT SHIELD	
159	ARCING CONTACT HINGE	
173	PIN	
174	MOVING CONTACT ARM HINGE	
175	MOVING CONTACT ARM	
176	AUXILIARY CONTACT	
179	1/4-20 X 1/2 HEX. STL. BOLT	
180	SHUNT CLIP	
181	1/2-13 X 2 1/2 HEX. STL. BOLT	
* 182	SPRING, MAIN CONTACT	
* 183	SPRING, BRIDGE	
* 184	SPRING, ARCING CONTACT	
400	OVERCURRENT TRIP	
* 131	SPRING, ACCELERATING	
451	BOLT, 1/2-13 X 2 1/2 HEX. STL.	
478	BOLT, 1/2-13 X 2 1/2 HEX. STL.	

* REPAIR PARTS

FIG. 2 - Pole Unit







OPEN

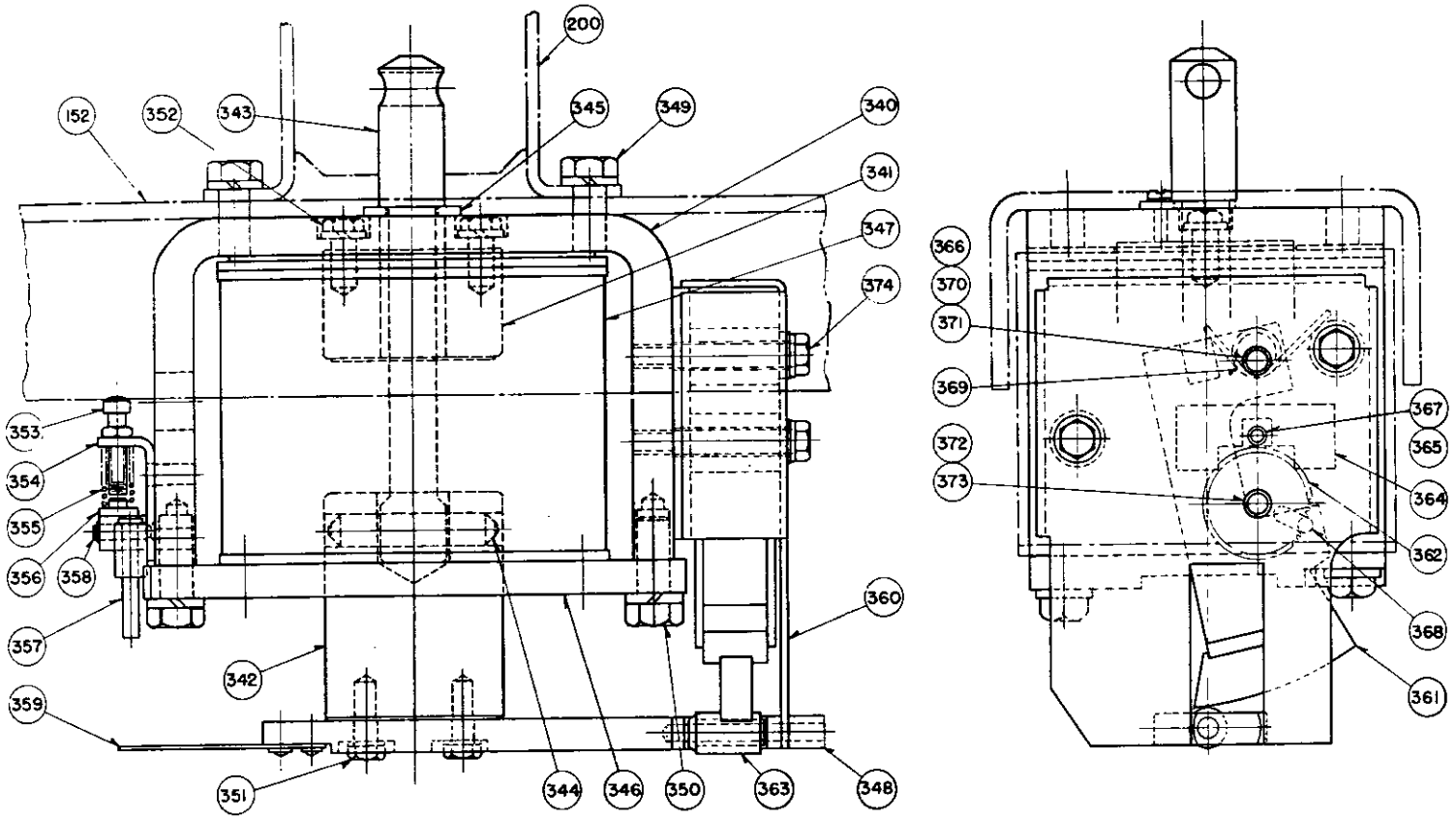
CLOSED

TRIPPED

	166	OPERATING HANDLE
	200	FRAME, MECHANISM
	201	BEARING, ROLLER
	203	LINK, FIRST TOGGLE
	204	LINK, SECOND TOGGLE
	205	LINK
	206	LINK, THIRD TOGGLE
	207	LEVER, CLOSING
	208	LATCH
	209	PAWL
	210	LATCH, ROLLER
	211	ROLLER
	212	PIN
	214	PIN
	216	PIN
	217	PIN
	218	PIN
	219	PIN
	220	LEVER, TRIP
	221	TRIGGER
	222	STOP, SPRING
*	223	SPRING, ROLLER LATCH
	224	PIN
*	225	SPRING, PAWL
	226	PIN
	227	PIN
	228	LINK, INDICATOR
	229	PIN
	230	INDICATOR
	232	SHAFT
	233	HANDLE LATCH
	234	ANTI-BOUNCE LATCH
	235	LEVER
	236	ROLLER
	237	PIN
	238	PIN
	239	COVER
	241	PIN
	242	FINGER, TRIP
	243	SCREW, TRIP
	245	PIN
	246	SPACER
	247	SPACER
*	248	SPRING, HANDLE LATCH

*REPAIR PARTS

FIG. 3 - Operating Mechanism



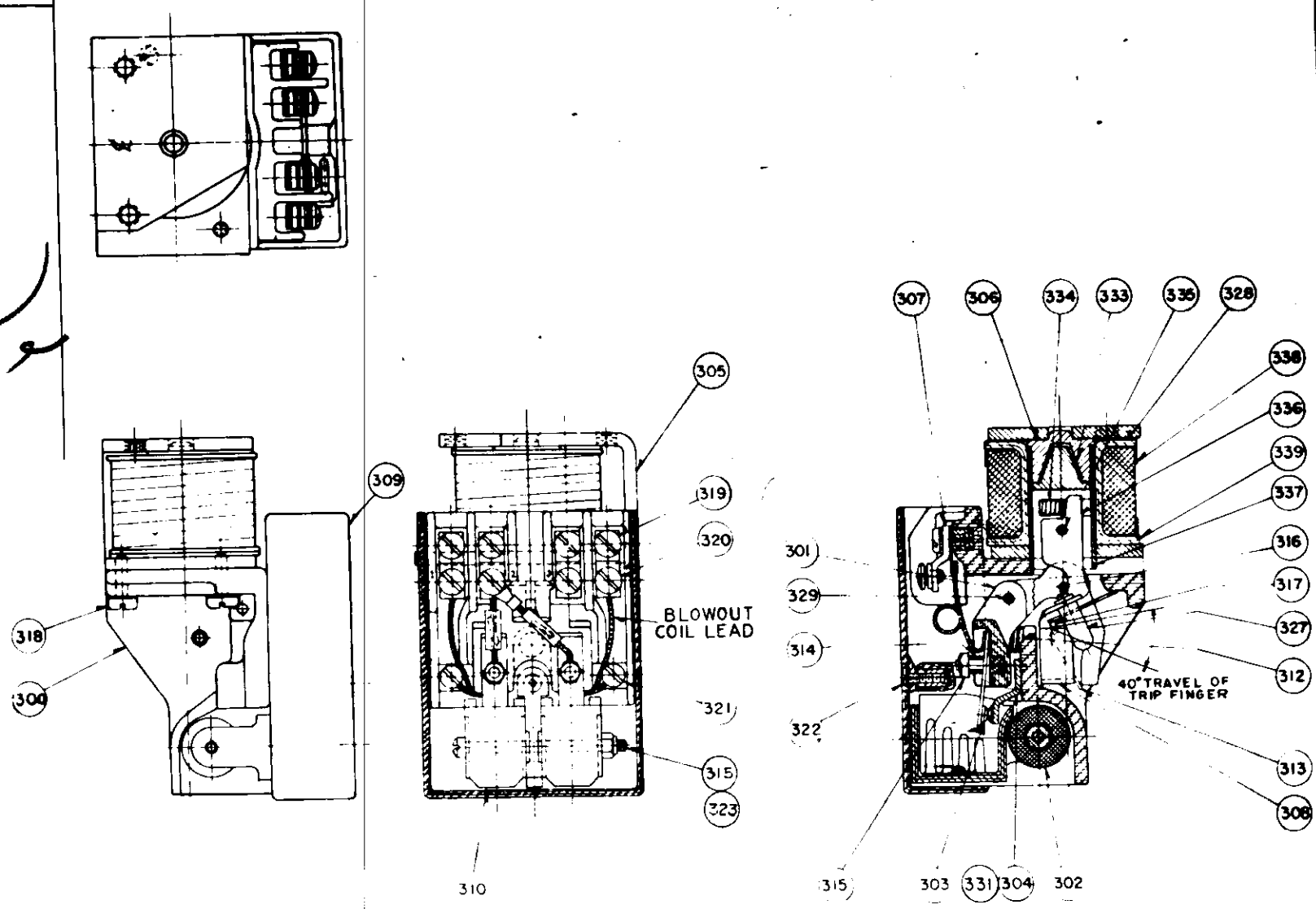
152	PLATFORM	
200	MECHANISM	
340	CLOSING MAGNET YOKE	
341	STATIONARY CORE	
342	MOVING CORE	
343	OPERATING ROD	
344	PIN	
345	STOP	
346	PLATE	
*	347	COIL
348	ARM	
349	BOLT	
350	BOLT	

351	BOLT	
352	BOLT	
353	ADJUSTING SCREW	
354	BRACKET, RELAY KICKER	
*	355	SPRING
356	RELAY KICKER	
357	TRIP ROD	
358	PIN	
359	TRIP BRACKET	
360	ANTI-SHOCK-CLOSE DEVICE	
361	CAM	
362	WHEEL	
363	ROLLER	

364	OSCILLATOR	
365	PIN	
366	BRS. WASHER	
367	TRUARC RING	
368	PIN	
*	369	SPRING, RESET
370	PIN	
371	TRUARC RING	
372	PIN	
373	TRUARC RING	
374	BOLT	

* REPAIR PARTS

FIG. 4 - Closing Magnet and Anti-Shock-Close Device



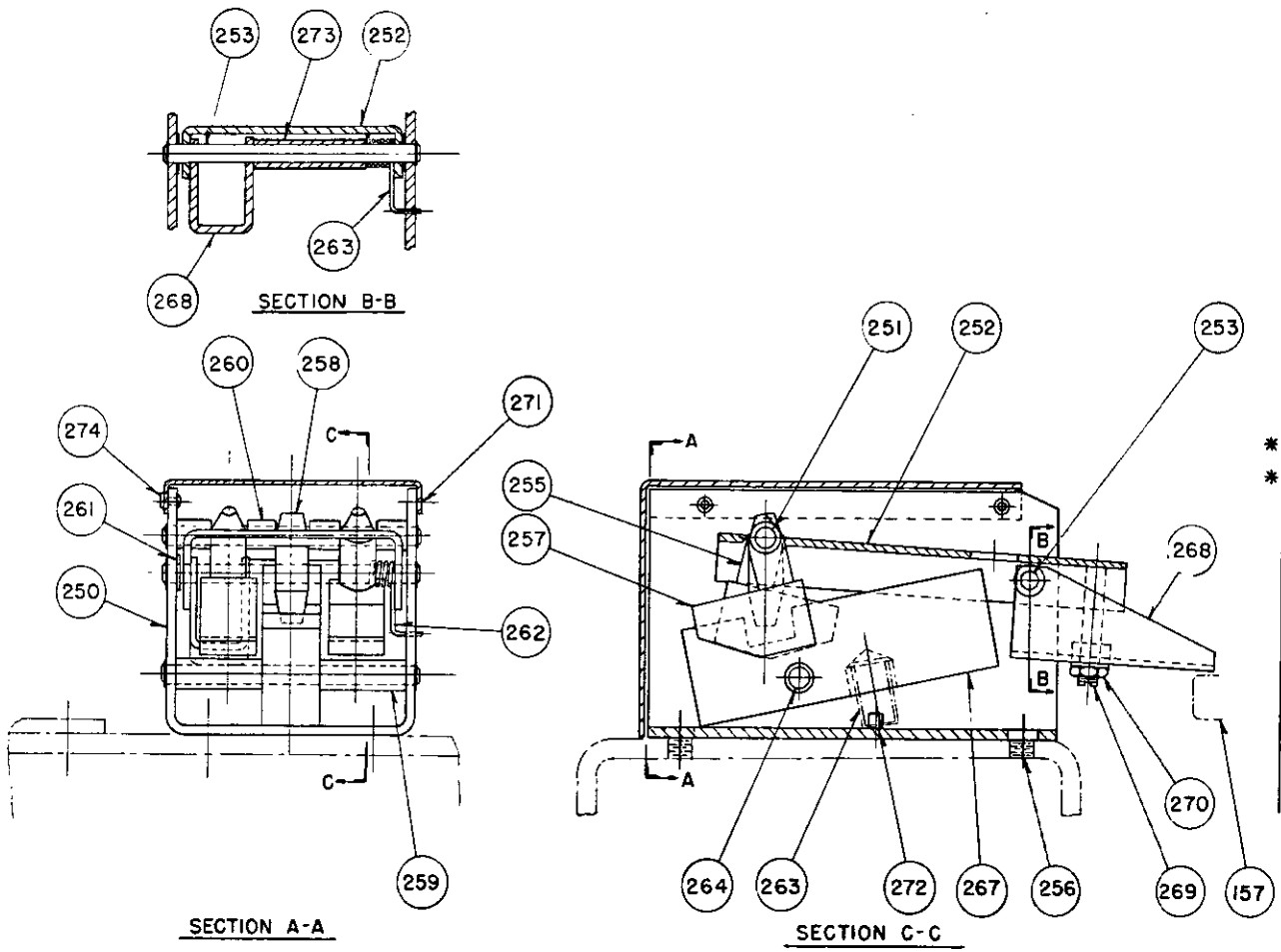
CLOSING RELAY

300	RELAY BASE	321	164-32 X 3/8 PAN HD. SCR.
301	MOVING CONT. ARM ASSY.	322	164-32 X 3/4 PAN HD. SCR.
* 302	BLOWOUT MAGNET ASSY	323	190-32 X 2 1/2 FIL. HD. SCR.
* 303	MOVING CONT. ASS'Y.		
* 304	STAT. CONT. ASS'Y. R.H.		
305	FRAME		
306	STAT. CORE	327	TRIP PIN
307	TERMINAL BRACKET	328	SPRING WASHER
308	RELEASE BRACKET	329	CONTACT ARM PIN
309	COVER		
310	ARC CHAMBER	* 331	STAT. CONT. ASS'Y. L.H.
* 312	SPRING, CONTACT ARM	333	MOVING CORE
* 313	SPRING, TRIP	* 334	SPRING, LATCH
* 314	SPRING, CONTACT	335	PIN
315	ELASTIC STOP NUT	336	LATCH
316	LATCH PIN	337	GUIDE TUBE
317	RELEASE BRKT PIN	* 338	OPERATING COIL
318	1/4-20 X 5/8 SCREW	339	MOLDED SPOOL
319	190-32 X 3/8 SCREW		
320	190 X 1/4 BINDING HD. SCR.		

* SPARE PARTS

Fig. 5

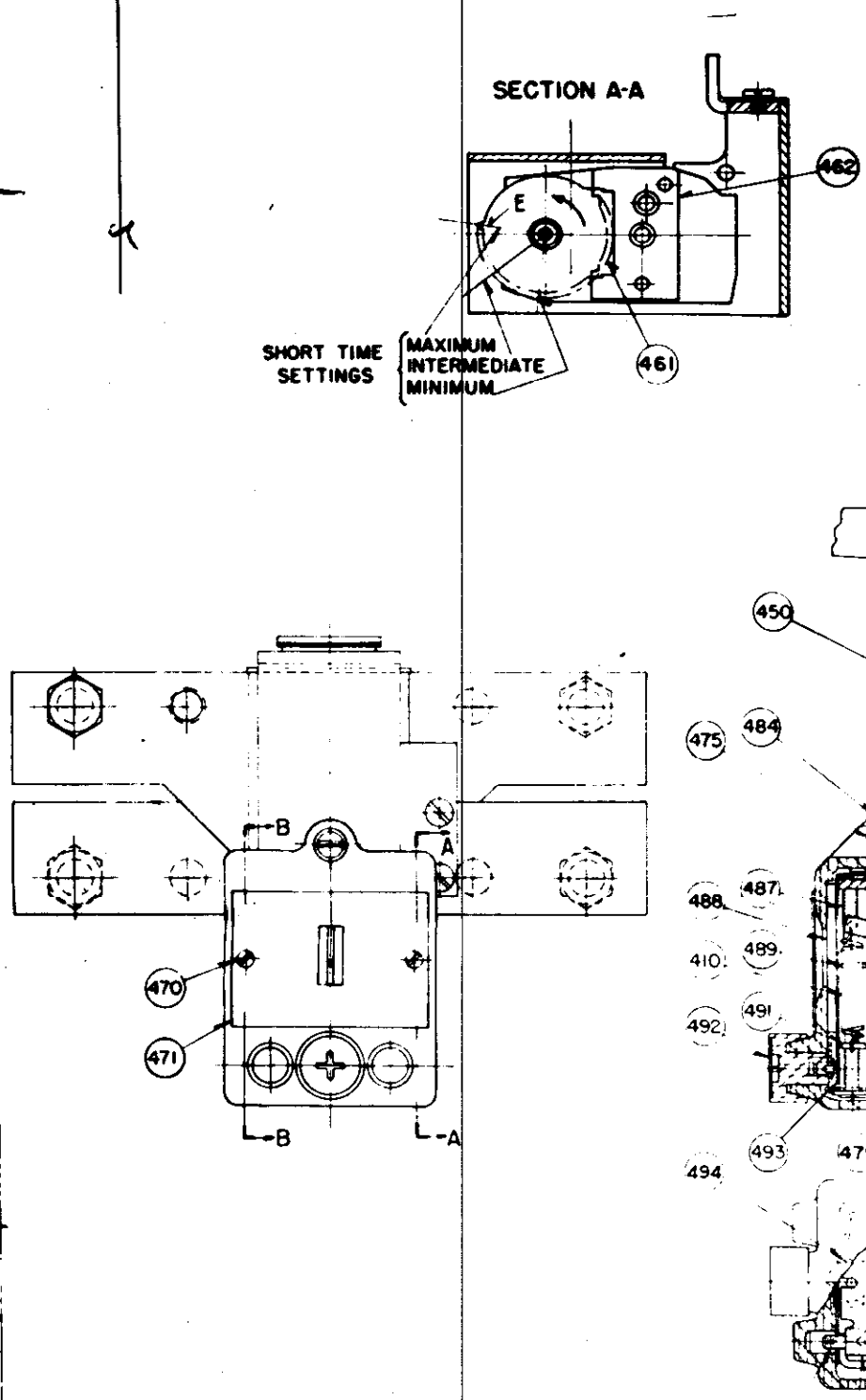
WESTINGHOUSE ELECTRIC CORPORATION
HCD-TYPE DBN-105 (250 V.)
CLOSING RELAY ASS'Y. FOR
INSTRUCTION BOOK
400D859



	250	BRACKET, ANTI-SHOCK-OPEN
	251	PIN
	252	PLATE
	253	PIN
	255	STUD
	256	SCREW
	257	WEIGHT
	258	STUD
	259	SPACER
	260	SPACER
	261	WASHER
*	262	SPRING, RESET
*	263	SPRING, WEIGHT
	264	PIN
	267	WEIGHT
	268	LEVER
	269	SET SCREW, 1/4-20 X 1 1/2 HEADLESS
	270	LOCKNUT, 1/4-20
	271	SCREW, .164-32 X 3/8 PAN. SEMS
	272	RIVET
	273	SPACER
	274	RIVET
	157	TRIP BAR

* REPAIR PARTS

FIG. 6 - Anti-Shock-Open Device



OVERCURRENT TRIP-

100	BASE, MOLDED	
105	STUD, LOWER	
242	FINGER, TRIP	
* 410	SPRING, CALIBRATION	
* 420	SPRING, INSTANTANEOUS	
440	TUBE ASSEMBLY	
450	COIL, CURRENT	
451	BOLT, 1/2-13X2 1/2 HEX. STL.	
455	ARMATURE	
456	ARM	
457	YOKE	
458	HOUSING	
459	TOGGLE & LEVER ASSEMBLY	
460	GEAR SEGMENT	
461	OSCILLATOR WHEEL	
462	OSCILLATOR	
463	PIN	
464	ROLLER	
465	PIN	
466	PIN	
467	RING, END	
468	YOKE RING	
469	SCREW, ADJUSTING	
470	SCREW	
471	NAMEPLATE	
472	PIN	
473	SCREW	
474	PINION	
475	SCREW, 190-32X3/8 STL. MACH.	
478	BOLT, 1/2-13X 4 HEX. STL.	
479	SCREW	
484	COVER, MOLDED	
487	SCREW, CALIBRATION	
488	COVER, TRANSPARENT	
489	POINTER	
491	SPRING END	
492	KNOB, ADJUSTING	
493	SCALE PLATE	
494	GEAR, STAR	
495	SCREW	
496	BRACKET, BOTTOM	

* REPAIR PARTS

WESTINGHOUSE ELECTRIC CORPORATION

Fig. 7
445D046

Figure 8
Overcurrent Tripping Curve

Curve 388513 is not available at this time but will be included in the final book.

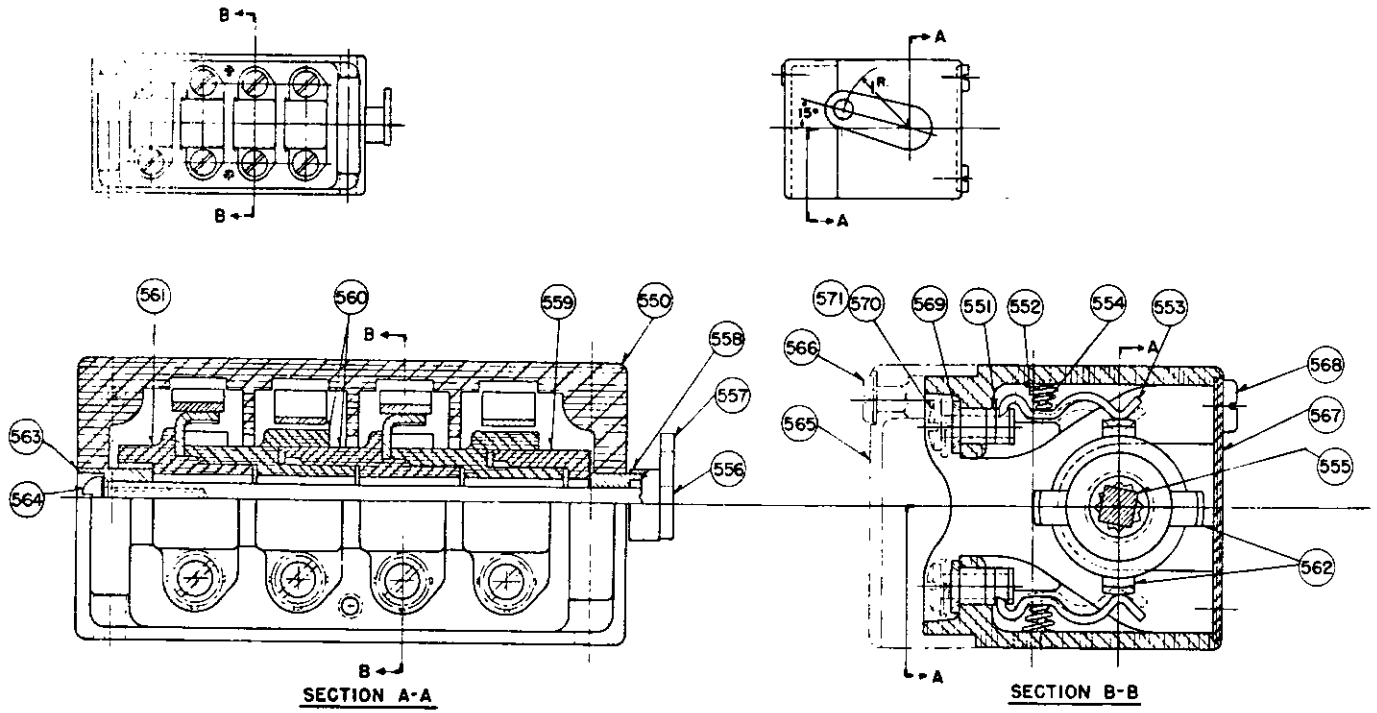


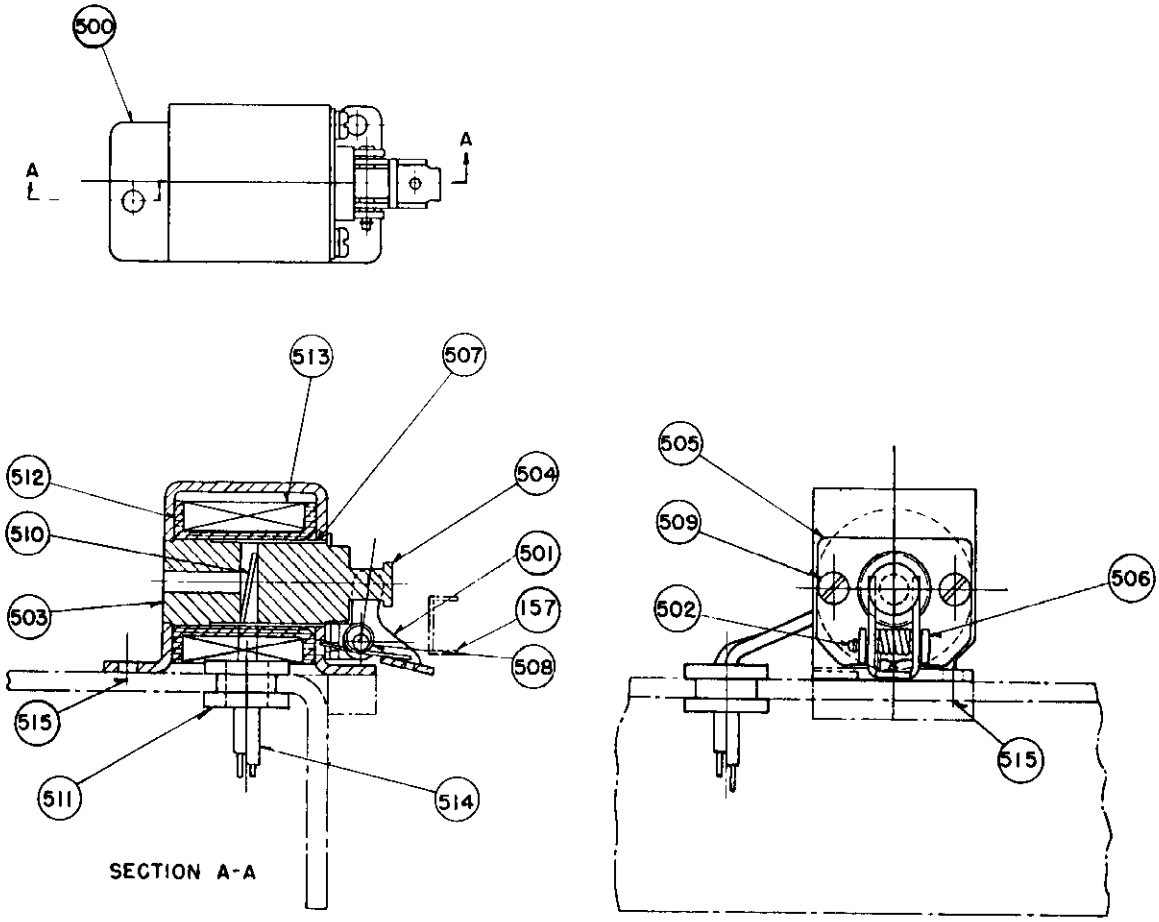
FIG. 9 - Auxiliary Switch

-AUXILIARY SWITCH-

*	550	AUXILIARY SWITCH
	551	STEM
	552	CONTACT SPRING
	553	CONTACT FINGER
	554	RIVET
	555	SHAFT
	556	SHAFT END
	557	ARM
	558	SPACER
	559	ROTOR END
	560	ROTOR SECTION

561	ROTOR END
562	CONTACT
563	BUSHING
564	.190-32 X ½ RD. T. C. SEMS MACH. SCR.
565	COVER
566	.164-32 X ¾ PAN BL. STL. SEMS MACH. SCR.
567	COVER
568	.164-32 X ⅜ PAN T. C. BL. STL. MACH. SCR.
569	COLLAR
570	.164-32 X ½ BD. SI. BRZ. MACH. SCR.
571	CRIMP WASHER

* REPAIR PARTS



-SHUNT TRIP-

	500	SHUNT TRIP FRAME
	501	TRIP LEVER
	502	PIN
	503	STATIONARY CORE
	504	MOVING CORE
	505	PLATE
	506	BRACKET
	507	SLEEVE
*	508	SPRING, RESET
	509	SCREW
	510	WASHER
	511	BUSHING
	512	COIL SPOOL
*	513	COIL
	514	LEADS
	515	BOLTS
	157	TRIP BAR

*REPAIR PARTS

FIG. 10 - Shunt Trip Device

CERTIFICATION DATA FOR CIRCUIT BREAKERS

A. MASTER DRAWING 56205-3221579 REVISION 0
B. MFR'S. DRAWING NO. 1-JH-481 REVISION
C. MASTER DRAWING FIGURES APPLICABLE TO CONTRACT 1, 4
WIRING DIAGRAM SHEET 3
D. APPLICABLE SPECIFICATION MIL-C-1938 & MIL-C-17409A
AND AMENDMENTS
E. NAVY CONTRACT OR SHIPBUILDER'S ORDER NO. NObs-62391
F. MFR'S ORDER NO. G.O. WG-70870-L3 S.O. 32-Y-4762
G. CIRCUIT BREAKER TYPE AND FRAME SIZE-NAVY ACB-1600 FRAME
MFR'S. DBN-60S
H. DESCRIPTION OF CIRCUIT BREAKER
VOLTAGE 355 D.C. MEANS OF CLOSING MANUAL & ELECTRIC
NO. OF POLES 2 NO. OF OVERCURRENT COILS 2
CONNECTIONS REAR MOUNTING DEAD FRONT STATIONARY
AUXILLIARY SWITCH CIRCUITS 8 (2 N.C. & 6 N.O.) SEE SHEET 3
OVERCURRENT TRIPPING CURVE MFR'S. NO. 388513A
I. COIL RATINGS, PICKUP AND TIME SETTINGS:—
1. OVERCURRENT COIL RATING-AMPERES 3000
2. LONG-TIME DELAY PICKUP SETTING-AMPERES NONE
3. SHORT TIME DELAY PICKUP SETTING-AMPERES 16,000
4. SHORT TIME DELAY BAND SETTING 3
5. INSTANTANEOUS PICKUP SETTING 27,000
6. SHUNT TRIP COIL RATING-VOLTS ..... 250 (100-355) D.C.
7. CLOSE COIL RATING — VOLTS ..... 250 (175-355) D.C.
* 8. CLOSING RELAY COIL RATING-VOLTS ..... 250 (175-355) D.C.
9. REVERSE CURRENT TRIP SETTING - AMPERES ... NONE
10. REVERSE CURRENT POTENTIAL COIL - VOLTS ... NONE
J. NUMBER OF SHIPS INVOLVED 2
K. IDENTIFICATION NUMBERS OF SHIPS SSR-572 & 573
L. NUMBER OF CIRCUIT BREAKERS PER SHIP 2
M. TOTAL NO. OF CIRCUIT BREAKERS INVOLVED 4
N. REPAIR PARTS — — — — — — — — — — SHEET NO. 2
O. ADDITIONAL DATA, REMARKS, NOTES:-
HOLD-IN OMITTED.
REMOTE MANUAL TRIP SUPPLIED.
* CLOSING RELAY COIL HAS AN INTERMITTENT RATING.
ENCLOSURE SUPPLIED.

DRAFTSMAN DATE Thomson 5-27-54 CHECKER CERTIFIED H. Hillenmeyer 6/27/54 BUSHIPS APPROVAL LETTER NObs 62391 (560) Ser. 560-9449 OF AUG. 23, 1954	CERTIFICATION DATA TYPE DBN-60S AIR CIRCUIT BREAKER BATTERY BREAKER	WESTINGHOUSE ELECTRIC CORPORATION EAST PITTSBURGH PA. USA DWG. 32 B 8054 SUB 2 BUSHIPS DWG NO. 55572-56205-1503468 REV SHEET 1 OF 3

Fig. 11 - Certification Data (Ob...

REPAIR PARTS LIST

NAVY CONTRACT- NObs-62391

WESTINGHOUSE G.O. WG-70870-L3 S.O. 32-Y-4762

ITEM NO.	NUMBER OF REPAIR PARTS	NO. INSTALLED PER VESSEL	NAME OF PART	IDENTIFICATION			
				WESTINGHOUSE			STANDARD NAVY STOCK NO.
				STYLE NO.	WT. LB.	DRAWING NO.	
1		4	CONTACT - MOVING ARCING	1584472	.8	28A1391	H17WX-12877
2		4	CONTACT - STATIONARY ARCING	1584473	.5	22B1721	H17WX-12878
3		8	SPRING - ACCELERATING	1584468	.03	18D6383	H17WX-12873
4		2	SPRING - ROLLER LATCH	1584519	.01	8D3981	H17WX-12879
5		16	SPRING - MAIN CONTACT	1584469	.05	18D6383	H17WX-12874
6		32	SPRING - BRIDGE CONTACT	1584470	.08	18D6383	H17WX-12875
7		4	SPRING - ARCING CONTACT	1584471	.08	18D6383	H17WX 12876
8		2	SPRING - WEIGHT (A.S. OPEN)	1584522	.02	9D9236	H17WX-12881
9		2	SPRING - RESET (A.S. OPEN)	1584521	.02	21D4345	H17WX-12880
10		2	SPRING - RESET (A.S. CLOSE)	1611996	.02	23D5209	H17WX-12888
11		2	SPRING - SHUNT TRIP	1491282	.02	17D1520	H17WX-12854
12		2	COIL - SHUNT TRIP 250 V.D.C	1802140	.6	L-517534	
13		2	SPRING - HANDLE LATCH	1589485	.02	21D7417	H17WX-12883
14	SEE SHEET 2 DWG. 32B8055	2	SPRING - PAWL	1581956	.03	8D3981	H17WX-12870
15		8	SPRING - CALIBRATION (O.C)	1574796	.02	19D8833	H17WX-12865
16		4	SPRING - INST. (O.C.)	1736401	.02	19D8833	
17		2	AUXILIARY SWITCH	1581958	.9	18A3835	H17WX-12871
18		2	AUXILIARY SWITCH	1767105	.9	25B3146	
19		2	COIL (SOLENOID) 250 V.D.C.	1802122	16	L-517533	
20		2	SPRING - ARM (RELAY)	1574332	.02	17D5806	H17WX-12859
21		2	SPRING - LATCH (RELAY)	1491484	.02	17D5806	H17WX-12856
22		2	SPRING - TRIP (RELAY)	1533822	.02	18D9176	H17WX-12857
23		2	CONTACT-L.H. STATIONARY(RELAY)	1589493	.03	23A3609	H17WX-12885
24		2	CONTACT-R.H. STATIONARY(RELAY)	1491296	.03	23A3609	P17WX-1990
25		4	CONTACT - MOVING (RELAY)	1589495	.03	23A3609	H17WX-12886
26		4	SPRING - CONTACT (RELAY)	1491306	.01	17D5806	H17WX-12855
27		4	BLOWOUT MAGNET (RELAY)	1589340	.05	13C9668	H17WX-12882
28		2	COIL (RELAY) 250 V.D.C.	1581778	.66	L-484463	P17WX-1986
29		2	SPRING (REMOTE MAN TRIP)	1809207	.06	18D6383	
30		2	SPRING - RELAY - ANTI-SHOCK TRIP	1584396		18D6383	H17WX-12872

DRAFTSMAN DATE
THOMSON 5-27-54
CHECKER
CERTIFIED Hillenmeyer 6/24/54

BUSHIPS APPROVAL LETTER
NObs 62391-(560)
Ser 560-3449
OF AUG. 23, 1954

CERTIFICATION DATA

TYPE DBN-60S
AIR CIRCUIT BREAKER

BATTERY BREAKER

WESTINGHOUSE ELECTRIC CORPORATION
EAST PITTSBURGH PA. U.S.A.

DWG. 32B8054 SUB. 2

BUSHIPS DWG. NO.	REV.
55572-56205-1503468	

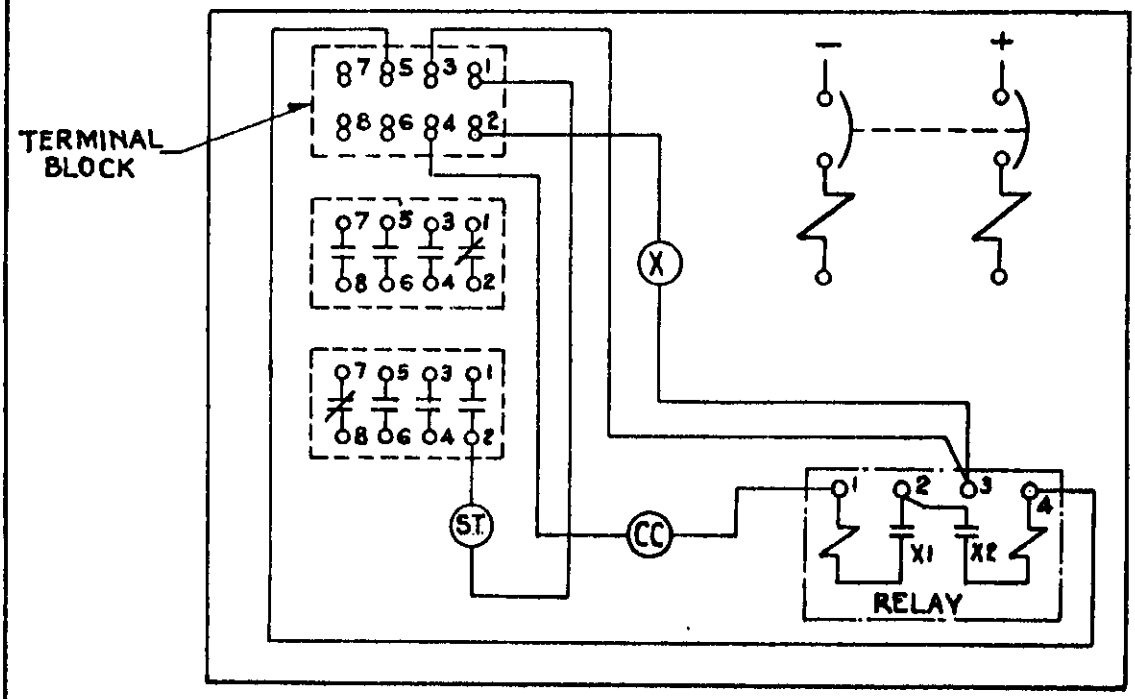
SHEET 2 OF 3

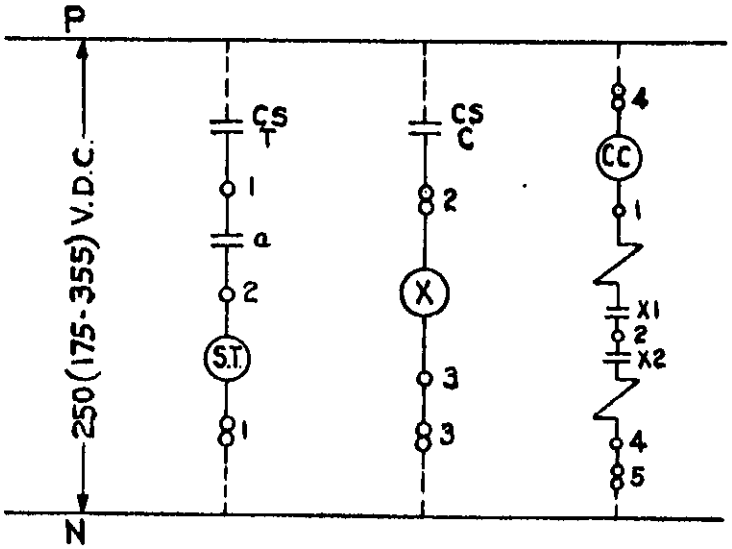
Fig. 11 Certification Data (Sheet 2 of 3)

WIRING DIAGRAM - FRONT VIEW

NAVY CONTRACT- NObs-62391

WESTINGHOUSE G.O. WG-70870-L3 S. O 32-Y-4762





DRAFTSMAN THOMSON DATE 5-27-54 CHECKER CERTIFIED Lillenwater 6/24/54 BUSHIPS APPROVAL LETTER NObs 62391 (560U) Ser 560-9449 of AUG. 23, 1954	CERTIFICATION DATA TYPE DBN-60S AIR CIRUIT BREAKER BATTERY BREAKER	WESTINGHOUSE ELECTRIC CORPORATION EAST PITTSBURGH PA. U.S.A. DWG. 32 B 8054 SUB. 2 BUSHIPS DWG. NO. 55572-56205-1503468 REV. SHEET 3 OF 3

AIR CIRCUIT BREAKER TYPE DBN 603 NAVY TYPE ACB 1600 FRAME

1-JH-481

DESCRIPTIVE DATA

MFR.	WESTINGHOUSE ELECTRIC CORPORATION
TYPE	NAVY ACB MFR. DBN-603
VOLTAGE RATING	508 VDC
KIND OF CURRENT	DC
FRAME SIZE	1600
CONTINUOUS CURRENT RATING (DEPEND)	3000 AMPS
INTERRUPTING CURRENT RATING	100000 AMPS FOR .30 MIN
INTERRUPTING RATING	8 100000 AMPS SINGLE POLE IN CELL FIG 6
NO OF POLES	2
TYPE OF MOUNTING	STATIONARY - DEAD FRONT
CONNECTION	BACK
SHOCK RESISTANCE	6 CLASS HI
MEANS OF CLOSING	MANUAL & ELECTRIC
PROTECTIVE FUNCTIONS	OVERCURRENT TRIP DELAY SHORT TIME DELAY
ATTACHMENTS	CLOSING SOLENOID & RELAY SHUNT TRIP AUXILIARY SWITCH
AMBIENT TEMPERATURE	50°C
NAVY DEPT. SPEC.	NAVSHIPS 250-660-10
ELECTRONIC TO SPEC	SPECIAL SPEC

WEIGHT OF BASIC BREAKER 2 POLE

ATTACHMENTS	WEIGHT
CLOSING SOLENOID & RELAY	15 LBS
SHUNT TRIP	15 LBS
AUX. SWITCH - TYPE A	1 LB
AUX. SWITCH - TYPE B	1 LB
OVERLOAD - TYPE A	LBS

MASTER PLAN

WESTINGHOUSE ELECTRIC CORP. EAST PITTSBURGH PA. U.S.A.

DRAWN J.M.K. SCALE NONE

DATE 8-20-46

DRAWING NO. 8456A-467979 REV. Q

REVISIONS

REV	ZONE	DESCRIPTION	DATE	APPROVED

REPAIR PARTS LIST

NO.	NAME OF PART OR TOOL	STYLE	QTY. PER DWG.	SUGGESTED NAVY STOCK NO.
1	SPRING, CAM (BO)	1674796	1	9D 8825
2	SPRING, TRIP (OC)	*		
3	SPRING, ROLLER LATCH	1584398	1	6 D 3981
4	SPRING, TRIP	1585966	1	6 D 3981
5	SPRING, ACCELERATING	1584668	1	6 D 6383
6	SPRING, MAIN CONTACT	1584669	1	6 D 6383
7	SPRING, BRIDGE CONTACT	1584670	1	6 D 6383
8	SPRING, ANTI-SHOCK CLOSE	1611966	2	D 6345
9	SPRING, ANTI-SHOCK OPEN	1584502	2	D 6345
10	SPRING, ANTI-SHOCK OPEN	1584501	2	D 6345
11	SPRING, ANTI-SHOCK TRIP	1584396	1	D 6343
12	SPRING, (RELAY) ANTI-SHOCK TRIP	1584502	1	9 D 9236
13	SPRING, (SHUNT TRIP)	1691886	1	7 D 1620
14	COIL, (SHUNT TRIP) 250 VDC	1581729	1	L 464461
15	SPRING, ARMING CONTACT	1584671	1	6 D 6383
16	SPRING, MANUAL LATCH	1584668	1	6 D 6383
17	SPRING, REMOTE ARM TRIP	1584672	1	6 D 6383
18	CONTACT, STATIONARY (ARCING)	1584673	1	22 D 1721
19	CONTACT, MOVING (ARCING)	1584672	1	28A 1391
20	COIL (SOLENOID) 250 VDC	*		
21	SPRING, ARM (RELAY)	1574332	1	17 D 5606
22	SPRING, LATCH (RELAY)	1691464	1	17 D 5606
23	SPRING, TRIP (RELAY)	1533827	1	18 D 9178
24	CONTACT, LH STATIONARY (RELAY)	1584453	1	23A 3649
25	CONTACT, RH STATIONARY (RELAY)	1491296	1	23A 3609
26	CONTACT, MOVING (RELAY)	1584438	1	23A 3609
27	SPRING, CONTACT (RELAY)	1491306	1	11 D 5606
28	BLOWOUT MAGNET (RELAY)	1589340	1	15C 9668
29	COIL (RELAY) 250 VDC	1581728	1	L 464461

* AS PER CERTIFICATION DATA SHEET.